



Approval #

Product # 201614-O

Industry Services Division
1400 East Washington Avenue
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Wisconsin Building Product Evaluation

Material

Techno Metal Post Screw Pile System

Manufacturer

Techno-Pieux, Inc
1700 Setlakwe Street
Thetford, Quebec G6G 8B2 Canada

Submitter

Techno Metal Post of SE Wisconsin
1005 Richards Road
Hartland WI 53029

SCOPE OF EVALUATION

The Techno Metal Post helical pile foundation systems manufactured by Techno-Pieux Inc have been evaluated for use as foundation systems for use in 1 and 2-family dwellings in accordance with the current Wisconsin Uniform Dwelling Code (UDC) requirements and for use in commercial buildings in accordance with the below cited International Building Code (IBC) requirements of the current Wisconsin commercial building code. This approval is for installation of these anchors per the manufacturer's installation manual to support/resist loads as tested and published with the adjustments as noted below.

DESCRIPTION AND USE

The Techno Metal Post helical pile foundation systems are used to underpin foundations of existing structures or to form deep foundations for new structures. Techno Metal Post products are designed to transfer axial compression, axial tension, and lateral loads from the supported structures to suitable soil-bearing strata.

Techno Metal Post helical foundation system overall allowable axial capacity and allowable lateral capacity must be limited to no more than 60 kips axial capacity and 6 kips lateral capacity as required by Section 3.8 of AC308. That axial capacity depends on the analysis of interaction of brackets, shafts, helical plates, and soils, and must be the lowest value of those for bracket capacity, shaft capacity, helical bearing plate capacity and allowable soil capacity.

The installation of the auger-installed steel pile must be carried out as per the manufacturer's current instructions. The anchors must be screwed into the ground to below the frost line using mechanized equipment. The anchor is rotated into the ground with sufficient applied downward pressure (crowd) to advance the anchor one pitch distance per revolution, no faster than 24 revolutions per minute. The anchor is advanced until the applied torque value attains a specified value. Extensions are added to the central shaft as needed. The applied final loads may be tensile (uplift), compressive (bearing), shear (lateral), or a combination thereof.

Use limits to follow ICC ESR-3418 are as follows:

- When the product is installed in a soil where the conditions are corrosive to steel, adequate protection to the exposed steel must be provided. Product can be hot-dipped galvanized steel.
- The installer of the proposed helical piles must be trained and certified by Techno Metal Post. Using approved equipment, the installer must follow the manufacturer's current installation instructions and the uses and limitations specified in the installation manual.
- Each helical pile must be identified with a jobsite label containing the following information:
 - manufacturer's name & address;
 - the product catalog number and description;
 - the ICC report number ESR-3418; and
 - the name of the inspection agency (CTL/Thompson Inc. AA-735).
- The product may be used as part of a foundation system to support various constructions, provided that it is installed according to the manufacturer's current instructions and within the scope of the ICC-ES Report.
- Pile installation shall meet the 21 conditions cited in Section 4.2.2 of ICC ESR-3418.
- Product must be installed within 1° of vertical.
- Techno Metal Post helical foundation systems have been evaluated for support of structures assigned to Seismic Design Category A, B or C per IBC 1613. All brackets must be used to support structures that are laterally braced as defined in IBC 1810.2.2 provision. Evaluation of compliance to IBC 1810.3.11.1 for buildings in Seismic Design Category C is outside the scope of this evaluation.
- Tension applications are limited to being installed below surface to the helix of 12D, where D is the diameter of the helix plate.
- In all soil cases, a registered Wisconsin professional engineer skilled in such design must determine the number and spacing of the auger-installed steel piles required to carry the load. A certificate attesting to the conformity of the installation and the allowable loads for the piles must be provided.

TECHNICAL TESTING USED

Data in accordance with ICC-ES Acceptance Criteria for Helical Pile Systems and Devices (AC358), dated June 2013 was submitted to ICC in issuing ICC ESR-3418. This can be viewed at: http://www.icc-es.org/Reports/pdf_files/load_file.cfm?file_type=pdf&file_name=ESR-3418.pdf.

ADDITIONAL TECHNICAL TESTING

These unit designs were additionally evaluated (Evaluation Report CCMC 13059-R) through the Canadian Construction Materials Centre (CCMC), a program of the National Research Council of Canada to provide the technical requirements and performance criteria for evaluating helical steel piles. That evaluation included 66 tests in Canada, France and the U.S. on a variety of granular, silt-based and cohesive soils (37 in compression and 29 in tension). A safety factor of greater than 2 was used for all but 5 of those tests, with the remaining 5 using a factor of safety between 1.8 & 1.9 (deemed to be acceptable because displacement was minimal from 1 mm to 8 mm). The scope of that evaluation was restricted to the foundation system (steel piles and connectors). Steel shafts available in diameters of 1⁷/₈", 2³/₈", 3¹/₂", 4", 5¹/₂" & 6⁵/₈" with a wall thickness of 1¹/₈", 5¹/₃₂", 7¹/₃₂" or 5¹/₁₆", 7¹/₃₂", 1¹/₄" & 9¹/₃₂" respectively were included.

TABLE 1, Allowable Compressive and Tensile Loads for the Techno Metal Post Auger-installed Pile in Granular or Cohesive Soils or Silt¹

Applied Torque		Allowable Loads			
		Compression		Tension	
Nm	(lbf)	kN	(lb)	kN	(lb)
678	500	10	2250	5.0	1125
1017	750	15	3375	7.5	1688
1356	1000	20	4500	10	2250
1695	1250	25	5625	12.5	2813
2034	1500	30	6750	15	3375
2373	1750	35	7875	17.5	3938
2712	2000	40	9000	20	4500
3051	2250	45	10125	22.5	5063
3390	2500	50	11250	25	5625
3728	2750	55	12375	27.5	6188
4067	3000	60	13500	30	6750
4406	3275	65.1	14625	32.5	7313
4745	3500	70.1	15750	35	7875
5084	3750	75.1	16875	37.5	8438
5423	4000	80.1	18000	40	9000
5762	4250	85.1	19125	42.5	9563
6101	4500	90.1	20250	45	10125
6440	4750	95.1	21375	47.5	10688
6779	5000	100.1	22500	50	11250
7118	5250	105.1	23625	52.5	11813
7457	5500	110.1	24750	55	12375

7796	5750	115.1	25875	57.5	12938
8135	6000	120.1	27000	60	13500
8474	6250	124.6	28021	62.3	14011
8813	6500	127.5	28672	63.8	14336
9152	6750	130.3	29287	65.1	14643
9491	7000	132.8	29865	66.4	14933
9830	7250	135.3	30407	67.6	15204
10169	7500	137.5	30913	68.8	15457
10508	7750	139.6	31383	69.8	15692
10847	8000	141.5	31817	70.8	15909
11186	8250	143.3	32215	71.6	16107
11524	8500	144.9	32576	72.4	16288
11863	8750	146.3	32902	73.2	16451
12202	9000	147.6	33191	73.8	16595
12541	9250	148.8	33444	74.4	16722
12880	9500	150.0	33723	75.0	16862
13219	9750	151.8	34125	75.9	17063
13558	10000	155.7	35000	77.8	17500
13897	10250	159.6	35875	79.8	17938
14236	10500	163.5	36750	81.7	18375
14643	10800	168.1	37800	84.1	18900
14914	11000	171.2	38500	85.6	19250
15185	11200	174.4	39200	87.2	19600
15456	11400	177.5	39900	88.7	19950
15728	11600	180.6	40600	90.3	20300
15999	11800	183.7	41300	91.9	20650
16270	12000	186.8	42000	93.4	21000
16541	12200	189.9	42700	95.0	21350
16812	12400	193.0	43400	96.5	21700
17083	12600	196.2	44100	98.1	22050
17354	12800	199.3	44800	99.6	22050
17626	13000	203.4	45500	101.2	23100
17897	13200	205.5	46200	102.7	23450
18168	13400	208.6	46900	104.3	23450
18439	13600	211.7	47600	105.9	23800
18710	13800	214.8	48300	107.4	24150
18981	14000	218.0	49000	109.0	24500
19253	14200	221.1	49700	110.5	24850
19524	14400	224.2	50400	112.1	25200

Note to Table 1: The allowable loads identified in this Table are valid when the Techno Metal Post is installed in granular or cohesive soils or silt. The applied torque is the average of the values attained within the last 600 mm of installation. Special attention is required when the auger-installed steel piles are installed in a recently backfilled site or where the granular material exceeds 200 mm in diameter or in cohesive soils. In these cases, Table 1 does not apply and the allowable loads need to be determined by on-site confirmatory testing.

LIMITATIONS OF APPROVAL

The **IBC** limitations below are in accordance with the current **Wisconsin Amended ICC Code**: IBC 1809.4 requires minimum 12" footing width, thus specific adequate engineering analysis must be provided for sizes under minimum 12" diameter helix when used on all commercial building footing systems installed in Wisconsin. Footings shall be installed below frost depth.

The UDC limitations below are in accordance with the current **Wisconsin Uniform Dwelling Code**: Techno Metal Post helical pile foundation installed shall be installed below frost depth and installed in accordance with current manufacturer's installation instructions is granted an exception to the SPS 321.15(2)(b)1. minimum pier footing size of 2' x 2' when load test data is provided to the local building inspector upon completion of the pier footing installation.

DISCLAIMER

This approval will be valid through December 31, 2021, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The department is not endorsing or advertising this product. The Wisconsin Building Product Evaluation Number must be provided when plans that include this product are submitted for review. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Reviewed by: Jack A. Miller
Commercial building plan examiner

Approval Date: December 1, 2016 By: Jack A. Miller